

6D

Calculation of Minimum New Water Needs

Calculations of lower bound, or minimum, new water needs from 2020-level applied water budget shortages are presented by hydrologic region in Tables 6D-1 and 6D-2. In an applied water budget, supply and percent reapplication are defined as:

applied water supply = supply from primary sources + supply from reapplication ... (1)

percent reapplication = (supply from reapplication / supply from primary sources) × 100 ... (2)

In the tables, percent reapplication is calculated for each region from primary supplies and reapplied supplies (both surface water and groundwater) according to equation (2). This calculation is performed only in planning subareas that are forecasted to experience shortages in 2020.

Assuming that new supplies from water management options may be reapplied in the same proportion that existing primary supplies are reapplied, an applied water yield and a percent reapplication for the options may be similarly defined as:

applied water yield = new water supply + reapplication potential ... (3)

percent reapplication = (reapplication potential / new water supply) × 100 ... (4)

By substituting equation (4) into equation (3) and rearranging terms, a regional new water need may be defined as a function of a regional applied water shortage:

new water need = applied water shortage / (1 + [reapplication potential/100]) ... (5)

If the potential to reapply new water supplies does not exist in a region, then according to equation (5),

the new water need (maximum) is equal to the region's applied water shortage. If the potential to fully reapply new water supplies exists in a region, then equation (5) defines a minimum new water need. In the tables, the water shortage not due to overdraft ("other" shortage) is adjusted downward by the percent reapplication in accordance with equation (5). This value is summed with the overdraft shortage to arrive at the minimum new water need for the region.

As discussed in Chapter 3, regional supplies generated through groundwater overdraft are excluded from the Bulletin 160-98 water budgets because they do not represent sustainable sources of water supply. Excluding these supplies from the water budgets results in additional regional shortages. However, for clarity of presentation, the regional supplies available through reapplication of overdrafted groundwater supplies are not excluded from the water budgets. Therefore, shortages due to overdraft are not adjusted by the percent reapplication in Tables 6D-1 and 6D-2 to arrive at regional new water needs.

Based on the data presented in Table 6D-1, the minimum new water required to satisfy 2020 average year shortages is approximately 2.2 maf. Similarly, Table 6D-2 shows the minimum new water required to satisfy 2020 drought year shortages is approximately 5.4 maf. As discussed in Chapter 6, not all water management options are created equal in their ability to meet new water needs. Demand reduction options, for example, do not provide new water to a region, and no opportunities exist to multiply their effectiveness through reapplication. Therefore, if a region's options mix includes demand reduction options, the region's new water need will be greater than the minimum need.

TABLE 6D-1

Minimum New Water Needs by Hydrologic Region: 2020 Average Year

<i>Region</i>	<i>Percent^a Reapplication</i>	<i>Shortage (taf)</i>		<i>Minimum New Water Need (taf)</i>
		<i>Overdraft</i>	<i>Other</i>	
North Coast	—	0	0	0
San Francisco Bay	—	0	0	0
Central Coast	24.1	102	70	159
South Coast	12.5	0	944	839
Sacramento River	33.3	85	0	85
San Joaquin River	16.4	63	0	63
Tulare Lake	11.4	670	50	715
North Lahontan	5.4	0	10	9
South Lahontan	35.8	89	181	223
Colorado River	24.6	61	86	130
Total (rounded)	16.4	1,070	1,340	2,220

^a Percent reapplication is computed from supply data for PSAs that are forecasted to experience shortages in 2020.

TABLE 6D-2

Minimum New Water Needs by Hydrologic Region: 2020 Drought Year

<i>Region</i>	<i>Percent^a Reapplication</i>	<i>Shortage (taf)</i>		<i>Minimum New Water Need (taf)</i>
		<i>Overdraft</i>	<i>Other</i>	
North Coast	38.8	0	194	140
San Francisco Bay	0.5	0	287	286
Central Coast	17.8	102	168	245
South Coast	10.4	0	1,317	1,192
Sacramento River	26.3	85	904	801
San Joaquin River	17.4	63	648	615
Tulare Lake	24.0	670	1,181	1,623
North Lahontan	16.5	0	128	110
South Lahontan	34.8	89	219	252
Colorado River	25.3	61	97	138
Total (rounded)	18.8	1,070	5,140	5,400

^a Percent reapplication is computed from supply data for PSAs that are forecasted to experience shortages in 2020.